

Please read carefully before using the Manual

Wireless smart sensor Manual

Executive standard:

GB/T 3836.1-2021

GB/T 3836.4-2021

Q/RH130-2026

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Anhui Ronds Science & Technology Incorporated Company

Preface

This manual describes the use method and precautions of the Wireless smart sensor. Users must read it carefully before use. The Wireless smart sensor implements the enterprise standard Q/RH130-2026 of Anhui Ronds Science & Technology Incorporated Company.

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Warning:

- *Read the operation manual before installation and use, and install and operate in strict accordance with the methods in the manual.
- *Do not modify the circuit without authorization.
- *The model, specification and electrical parameters of related short circuits and components shall not be modified during maintenance.
- *It is forbidden to replace batteries in explosion-proof places, and batteries other than those specified in the specifications shall not be replaced.
- *The product shell contains plastic material, which has the potential danger of electrostatic charge! Avoid friction during use! Please wipe with a damp cloth when cleaning.

1. Overview

1.1 Uses and Application Scope

The Wireless smart sensor (hereinafter referred to as the sensor) can monitor the equipment vibration signal, and can monitor the vibration data for a long time and transmit it.

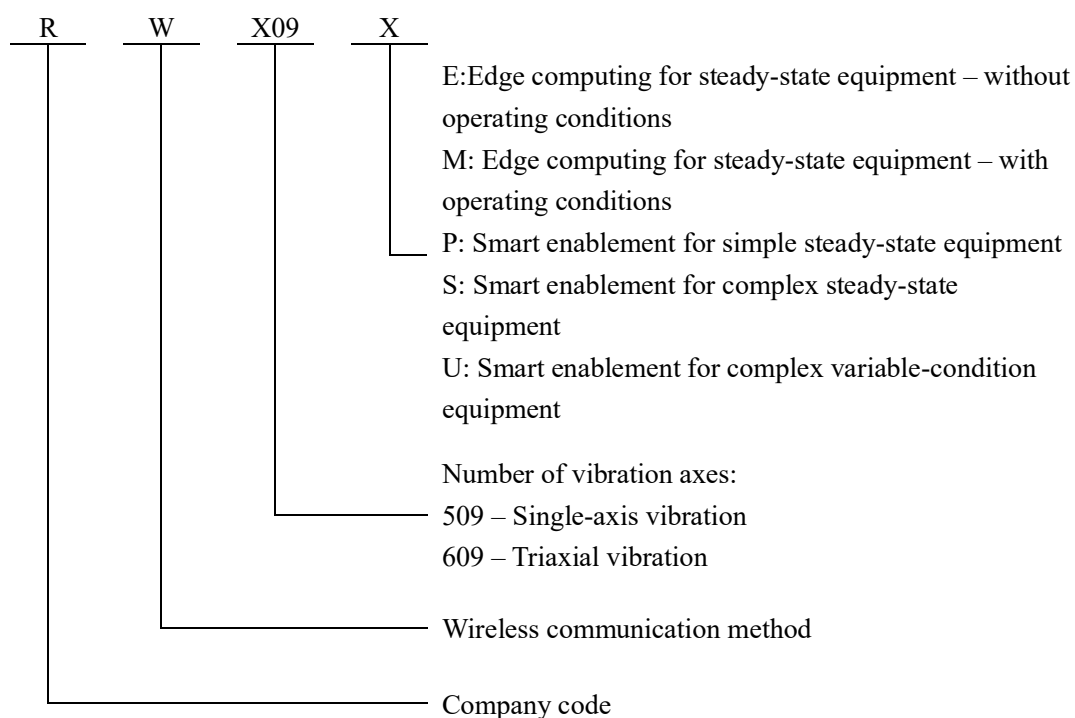
The sensor has intrinsically safe explosion-proof function and meets the standards of GB/T 3836.1-2021 *Explosive Atmospheres Part 1: Equipment--General Requirements* and GB/T 3836.4-2021 *Explosive Atmospheres Part 4: Equipment Protected by Intrinsically safe "i"*; The explosion-proof sign is Ex ia IIC T4 Ga, Ex ia IIIC T₂₀₀ 135°C Da, which can be installed in normal places and dangerous places in Zone 0 with IIA, IIB, IIC dangerous gases, as well as in Zone 20 with combustible dusts of groups IIIA, IIIB and IIIC. The sensor communicates wirelessly.

1.2 Functional Features

- (1) Wireless transmission. saves a lot of wiring work such as signal, power supply and network
- (2) Adopt transmission frequency of 915 MHz free frequency band, with long transmission distance and strong anti-interference ability, which is convenient for industrial field use

- (3) Low power design. Able to monitor and transmit vibration data for a long time.
- (4) Small size. Suitable for installation in various industrial sites.
- (5) Support temperature measurement.

1.3 Model description



The current product models are as follows:

Product Model	Feature Description
RW609U RW509U	Based on deep insights into vibration signals and time-series data, a comprehensive set of professional data preprocessing models has been developed; Based on equipment mechanisms, fault cases, etc., various fault data characteristics are analyzed, and corresponding fault features are extracted from the collected data to compensate for the shortcomings of traditional overall-value indicators; Edge intelligent computing indicators increased to 200; Added speed identification function, supporting speed calculation for variable-speed equipment; Piezoelectric analysis frequencies: 1000 Hz, 2000 Hz, 5000 Hz, 10000 Hz, 20000 Hz RW609U: triaxial vibration & temperature sensor + synchronized acquisition between sensors RW509U: single-axis vibration & temperature sensor + synchronized acquisition between sensors

RW609S RW509S	Based on deep insights into vibration signals and time-series data, a comprehensive set of professional data preprocessing models has been developed; Based on equipment mechanisms, fault cases, etc., various fault data characteristics are analyzed, and corresponding fault features are extracted from the collected data to compensate for the shortcomings of traditional overall-value indicators; Edge intelligent computing indicators increased to 150; Added speed identification function, capable of calculating steady-state equipment speed; Piezoelectric analysis frequencies: 1000 Hz, 2000 Hz, 10000 Hz, 20000 Hz RW609S: triaxial vibration & temperature sensor + synchronized acquisition between sensors RW509S: single-axis vibration & temperature sensor + synchronized acquisition between sensors
RW609P RW509P	Based on deep insights into vibration signals and time-series data, a comprehensive set of professional data preprocessing models has been developed; Based on equipment mechanisms, fault cases, etc., various fault data characteristics are analyzed, and corresponding fault features are extracted from the collected data to compensate for the shortcomings of traditional overall-value indicators; Edge intelligent computing indicators increased to 100; Added speed identification function, capable of calculating steady-state equipment speed; Piezoelectric analysis frequencies: 1000 Hz, 2000 Hz, 10000 Hz, 20000 Hz RW609P: triaxial vibration & temperature sensor + synchronized acquisition between sensors RW509P: single-axis vibration & temperature sensor + synchronized acquisition between sensors
RW609M RW509M	Based on deep insights into vibration signals and time-series data, a comprehensive set of professional data preprocessing models has been developed; Based on equipment mechanisms, fault cases, etc., various fault data characteristics are analyzed, and corresponding fault features are extracted from the collected data to compensate for the shortcomings of traditional overall-value indicators; Edge intelligent computing indicators increased to 50; Added speed identification function, capable of calculating steady-state equipment speed; Piezoelectric analysis frequencies: 1000 Hz, 2000 Hz, 10000 Hz, 20000 Hz RW609M: triaxial vibration & temperature sensor + synchronized acquisition between sensors RW509M: single-axis vibration & temperature sensor + synchronized acquisition between sensors

RW609E RW509E	Piezoelectric analysis frequencies: 1000 Hz, 2000 Hz, 10000 Hz, 20000 Hz RW609E: triaxial vibration & temperature sensor + synchronized acquisition between sensors RW509E: single-axis vibration & temperature sensor + synchronized acquisition between sensors
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1.4 Application Environment Conditions

1.4.1 Working Environment Conditions

- a) Ambient temperature: $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$;
- b) Average relative humidity: $\leq 95\% \text{RH} (+25^{\circ}\text{C})$;
- c) Atmospheric pressure: $70\text{kPa} \sim 110\text{kPa}$;
- d) Occasions without ponding;
- e) Zone 0 hazardous places with IIA, IIB and IIC hazardous gases, but without corrosive gases damaging insulation. Zone 20 with combustible dusts of groups IIIA, IIIB and IIIC

1.4.2 Bearable Storage and Transportation Conditions

- a) High temperature: $+85^{\circ}\text{C}$;
- b) Low temperature: -40°C ;
- c) Average relative humidity: $93\% \pm 3\% \text{RH} (+25^{\circ}\text{C})$;
- d) Vibration: 50m/s^2 ;
- e) Impulse: 500m/s^2 .

1.5 Safety Features

Explosion proof type: intrinsically safe,

explosion-proof sign: Ex ia IIC T4 Ga, Ex ia IIIC T₂₀₀ 135°C Da.

2 Working Principle and Structural Features

2.1 Operating Voltage and Current

- a) Operating voltage: rated voltage 3.6V (battery is one of the following three models)

① EVE ER34615 Maximum open circuit voltage 3.9V;

② Haocheng battery ER34615: maximum open-circuit voltage 3.9 V;

- b) Operating current of the whole machine: $\leq 50\text{mA}$;

2.2 Measurement Range

vibration acceleration (Z-axis direction) measurement range:

$\pm 50g$; (g: gravitational acceleration $g=9.8m/s^2$)

vibration acceleration (X & Y-axis direction) measurement range:

$\pm 16g$ (g: gravitational acceleration $g=9.8m/s^2$)

Resolution ratio is $0.01m/s^2$;

Temperature measurement range: $-40^{\circ}C \sim 125^{\circ}C$;

2.3 Basic Error

Allowable basic error of vibration measurement: $\pm 3dB$;

2.4 Linearity

Linearity: 2%;

2.5 Signal Output Way

LORA 4.0 Sub-GHz Wireless communication:

(1)Frequency: 902 MHz-928 MHz

(2)Transmission distance: 300 meters line of sight.

2.6 IP Grade:IP68 (1m, 40min)

3 Dimensions, Weight and Material

3.1 Dimensions: $\phi 45.5 \times 110.3mm$ (diameter $\times$ Height, including mounting base);

3.2 Weight: About 320g (including mounting base);

3.3 Upper cover material: flame retardant PC;

Battery compartment material: flame retardant PA66 + 30% glass fiber + SUS304 (integrated injection molding);

Base and mounting base material: SUS316 stainless steel.

4.Installation and Operation Notices

(1)Please read the operation manual carefully before using this product.

(2)This product should be used and maintained by trained personnel or special personnel.

(3)Avoid knocking, falling, being close to high temperature source for a long time and being used in high corrosion environment for a long time.

(4)Install the sensor correctly to ensure the sensitivity of the sensor and the accuracy of the measured data.

(5)It is not allowed to replace the original device or structure to avoid affecting the

explosion-proof performance.

(6) Only use the following brands of specified models of batteries:

- ① EVE ER34615, 3.6V 19Ah Lithium Thionyl Chloride (LiSOCI₂)
- ② Haocheng ER34615, 3.6V 19Ah Lithium Thionyl Chloride (LiSOCI₂)

(7) The upper cover of the product and the shell of the battery compartment are made of flame retardant PA66 + 30% glass fiber + SUS304 (integrated injection molding), which has potential electrostatic hazards. Avoid friction during use! Please wipe with a damp cloth when cleaning.

5. Installation and Use

5.1 Production Date and Certificate Validity

- a) Production date: see "product delivery inspection report" for details;
- b) Certificate validity: see "explosion proof certificate" for details.

5.2 Installation Methods

Magnetic base + gluing, adapter base + screw hole, adapter base + welding

Note: If the vibration amplitude of equipment is large, it is recommended to adopt the installation method of adapter + screw hole or adapter + welding.

5.3 Use Methods

- a) Configure by using the supporting dongle.
- b) Set the same wireless band with matched gateway.
- c) When replacing the battery, it must be carried out in strict accordance with the relevant requirements of "repair and maintenance" in Article 4.

6. Repair and Maintenance

6.1 Repair

- 1) Please read the manual carefully before use and follow the operating steps.
- 2) Do not change any parameters of the sensor circuit.
- 3) Only use the battery model described in Article 4.
- 4) Battery replacement shall be carried out in a safe place.

6.2 Maintenance

6.2.1 A designated person must be responsible for the daily maintenance of the sensor.

6.2.2 Maintenance personnel must carefully read and be familiar with *Wireless smart sensor*

Manual and relevant circuit diagrams, and be familiar with the internal and external structure and circuit principle of the sensor.

6.2.3 The maintenance personnel should always check whether the sealing part of the sensor is compressed and whether the cover plate screws are fastened.

7.Common Fault Treatment

1)If the data cannot be uploaded, first check whether the battery is powered. If not, please replace the battery.

2)If the data is not uploaded in time, first check the wireless signal quality at the installation position to ensure that there is no shielding equipment around.

8.Transportation and Storage

8.1 Avoid violent vibration and impact when transporting and handling the sensor.

8.2 Strictly prohibited to put the sensor in the place directly dripping with water when store it.

9.Unpacking and Inspection

9.1 Pay attention to safety when unpacking to avoid damage to equipment or injury.

9.2 After unpacking, check whether the appearance of the equipment is damaged and whether the accessories are complete.

9.3 Accessories list

- | | |
|------------------------|-------|
| a) Instruction Manual | 1 pcs |
| b) Sensor | 1 pcs |
| c) Product certificate | 1 pcs |
| d) Packing list | 1 pcs |

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FCC Statement

FCC ID: 2AKW5-RONDS03

Please take attention that changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.